

## Example 1 - Summary

# Drought Water Management Program

### Emphasis

Develop institutional mechanisms to implement long-term contracts for drought water supply. Implement groundwater banking and demand management to reduce demand for Delta water and produce water for drought transfers.

### Distinguishing Features

This alternative provides a low level of resource improvement and conflict resolution.

Physical/Structural	Operational/Management	Institutional/Policy
<ul style="list-style-type: none"><li>• Long-term drought water bank to increase flexibility during dry years</li><li>• Groundwater banking facilities in the southern San Joaquin valley to reduce demand for surface water during dry years</li><li>• Basic habitat restoration to increase fish population and ecosystem function</li><li>• Basic level of levee improvements</li><li>• Screens on high-priority diversions to decrease fish loss</li><li>• About 100,000 AF of water storage to help reduce fish entrainment, thus increasing water supply reliability</li></ul>	<ul style="list-style-type: none"><li>• Reclamation and conservation to reduce demand for Delta water</li></ul>	<ul style="list-style-type: none"><li>• Drought water bank to facilitate dry-year water transfers</li></ul>

### Benefits

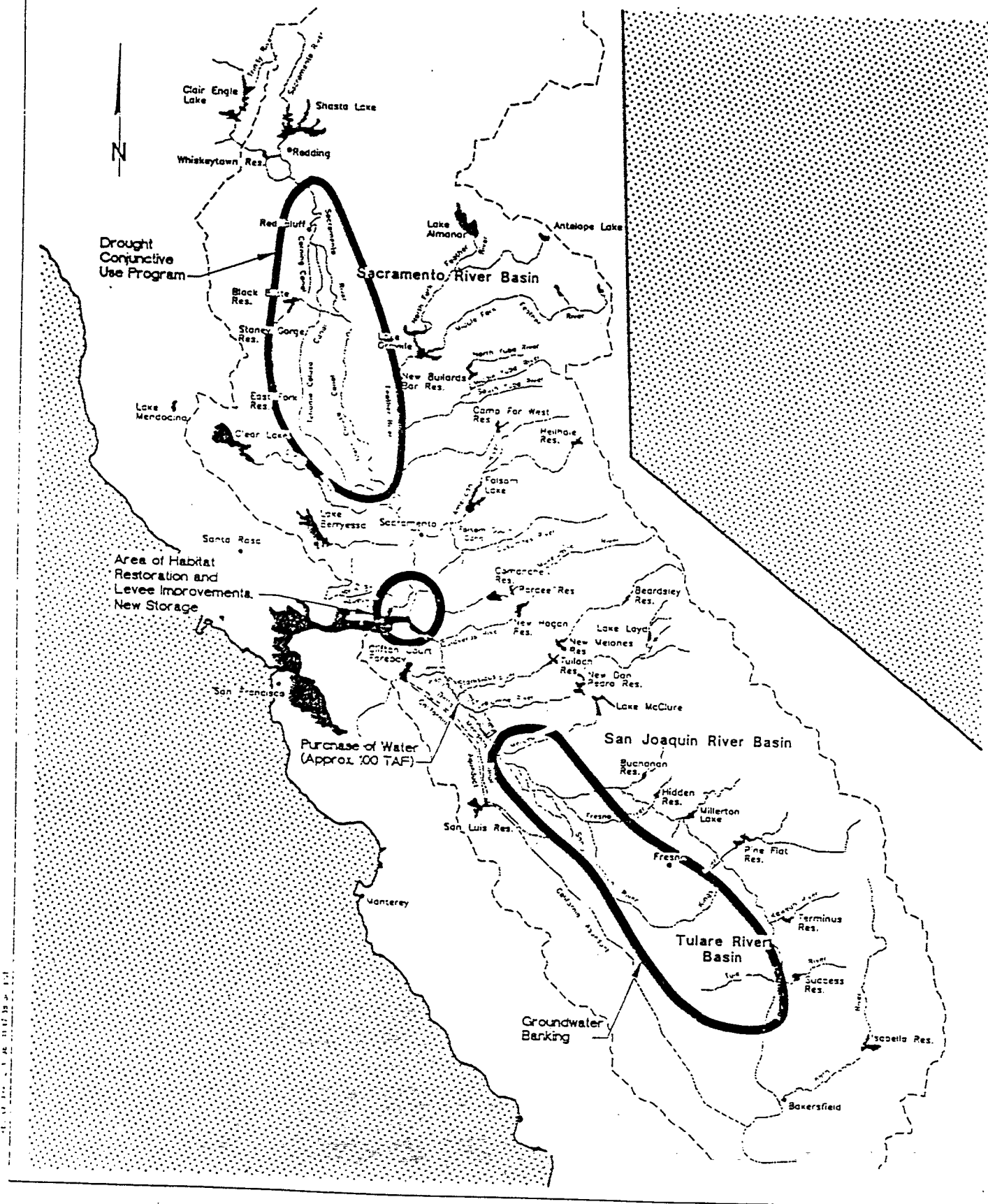
- Habitat restoration and change in timing of diversions improves ecosystem quality and restores the fishery
- Increases water supply predictability during dry years
- Funded levee management program decreases vulnerability of Delta functions to failure
- New screens reduce fish entrainment at diversions

### Constraints and Concerns

- Uncertain that drought bank will develop enough water to supply all needs
- Negative effects such as reversing south-Delta flow remain unresolved
- Provides little improvement in water quality
- Fish entrainment is reduced but still a concern.

# Drought Water Management

## Example 1



## Example 1 - Description

# Drought Water Management Program

## Overview

Develop institutional mechanisms to implement long-term contracts for drought water supply. Implement conjunctive use and groundwater banking programs as well as demand management programs to reduce demand for Delta water during dry years and produce water for drought transfers. Restore habitat to aid in the recovery of listed species.

During dry and critically dry years, many water users experience significant supply shortages. This alternative will improve water supply predictability during droughts by establishing a long-term drought water bank. The bank will enter into long-term contracts to acquire dry-year water from willing transferors. The bank will then contract with transferees for delivery of dry-year water. Transferors will reduce their dry-year need for surface water through demand management and implementing conjunctive use programs, using groundwater in order to make surface water available for transfer during drought years. The drought water bank program will also prepare the environmental documentation and implement the mitigation measures required to support drought water transfers. Other water users will reduce demands on Delta water through demand management. Basic levels of habitat restoration and levee improvements are included.

In addition to the drought water bank, an in-lieu groundwater program will convey surface water to users currently relying on over drafted groundwater basins. In wet years, these users will curtail groundwater pumping, thereby storing groundwater. In dry years, the stored groundwater will be pumped and delivered to users in lieu of surface water deliveries, making the surface water available for transfer. Demand management efforts will be increased. Best management practices (BMPs) for urban water conservation will be expanded and implemented on a uniform basis. Inclining block rates will be added to encourage reduced landscape irrigation use, and new BMPs such as increased efficiency in water-using home appliances may be adopted. In the agricultural sector, efficient water management practices (EWMPs) will be implemented and expanded to include water use measurement and water pricing to encourage increased efficiency. Water reclamation will target feasible and affordable urban and agricultural wastewater reclamation. Though the emphasis is on encouraging local projects, water reuse and demand management programs could be state and federally cosponsored in water project service areas.

Habitat restoration will take place in the river systems, the Delta, and the Bay. Restoration actions include improvement of channel features, restoration of channel depth to provide cooler water, and isolation of gravel quarry areas to protect young fish and increase survival rates. Delta and channel island restoration will increase shallow water and tidal wetland habitat for anadromous and Delta native fish. Riparian, wetland, and terrestrial habitat will be restored on Delta islands and upland areas, and boating zones will offer protection from large boat wakes. In the Bay, significant acres of tidal wetlands would be restored to provide wet-year spawning habitat for Delta smelt and rearing areas for salmon.

Flood protection will be improved by upgrading levees to a basic level. Critical western Delta islands with important regional infrastructure and other islands with both valuable local infrastructure and habitat will be improved. Other actions such as levee maintenance and stabilization using berms, modification of agricultural practices to reduce subsidence, setback levees, and funding for maintenance and an emergency levee management plan will also provide protection.

## Physical and Structural Features

### Habitat Restoration

Activities	Benefits
<ul style="list-style-type: none"> <li>• Restore riparian, shaded riverine, and shallow water habitat along Delta river channels</li> </ul>	<ul style="list-style-type: none"> <li>• Provides substantial improvement in aquatic habitat and consequent improvements in water supply reliability</li> </ul>
<ul style="list-style-type: none"> <li>• Restore Delta and floodway corridor shallow water and tidal wetland habitat</li> <li>• Restore approximately 75 to 125 miles of shallow water, riverine, and riparian habitat along Delta levees</li> </ul>	<ul style="list-style-type: none"> <li>• Provides spawning areas for Delta native fish as well as forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species and consequent improvements in water supply reliability</li> </ul>
<ul style="list-style-type: none"> <li>• Protect channel islands from erosion and enhance habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Provides habitat for aquatic and terrestrial plant and animal species</li> </ul>
<ul style="list-style-type: none"> <li>• Restore about 750 to 1,250 acres of tidal wetlands in Suisun Bay</li> </ul>	<ul style="list-style-type: none"> <li>• Provides wet-year spawning habitat for Delta smelt, rearing areas for salmon, and wildlife habitat (e.g., canvasback and redhead ducks)</li> </ul>
<ul style="list-style-type: none"> <li>• Restore riverine channel features in the San Joaquin River to lower water temperatures and reduce predation</li> </ul>	<ul style="list-style-type: none"> <li>• Improves fish survival</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>• Delta River Channel – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville.</li> <li>• Delta – Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta.</li> <li>• Floodway Corridors – Habitat restoration must not impair capacity of floodways.</li> <li>• Suisun Bay – Convert diked wetlands or create tidal wetlands with dredge spoils between Collinsville and Carquinez Strait.</li> <li>• San Joaquin River – Confine wide shallow channels and isolate in-channel gravel quarry areas.</li> </ul>	

### Fish Protection and Transport

Activities	Benefits
<ul style="list-style-type: none"> <li>• Construct a San Joaquin River bypass at the head of Old River</li> </ul>	<ul style="list-style-type: none"> <li>• Keeps out-migrating fish in the San Joaquin River</li> <li>• Allows for managing flows down Old River</li> </ul>
<ul style="list-style-type: none"> <li>• Install fish screens on highest priority diversions in the Delta, rivers, and tributaries</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces entrainment of fish</li> </ul>
<ul style="list-style-type: none"> <li>• Improve drainage in floodway corridors</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces fish stranding</li> </ul>

### Considerations

- Select diversions for screening according to criteria including size of intake, location, peril to fish, and screening feasibility.

## Water Storage

### Activities

- Develop about 100,000 AF of new storage in the Delta dedicated to environmental uses

### Benefits

- Reduces entrainment of fish
- Reduces frequency and duration of export curtailments, thus improving water supply reliability

### Considerations

- Environmentally dedicated water storage in the Delta allows reduction in diversions during critical periods.

## Flood Protection and Levee Stabilization

### Activities

- Provide a basic level of protection and stabilization of Delta levees

### Benefits

- Basic level of reduction in vulnerability of Delta land use and infrastructure
- Basic level of reduction in vulnerability of urban and agricultural export water supply
- Basic level of reduction in vulnerability of Delta ecosystem function

- Construct setback levees and stabilizing berms

- Reduces vulnerability of levees to failure
- Improves flood conveyance
- Provides opportunities for habitat restoration

### Considerations

- Upgrade all Delta levees to meet at least the hazard mitigation plan standards.
- Provide flood protection equivalent to Army Corps of Engineers PL 99 standard to critical western Delta islands with important regional infrastructure and islands with both important local infrastructure and valuable habitat.
- Integrate protection and stabilization of levees with Delta habitat restoration activities.
- Provide stable funding mechanism for ongoing levee and habitat maintenance.

## Operational and Management Features

### Water Diversion Management

Activities	Benefits
<ul style="list-style-type: none"> <li>• Improve real-time monitoring for locations of special-concern fish species and modify water diversions to reduce fish entrainment</li> </ul>	<ul style="list-style-type: none"> <li>• Provides an additional tool to help reduce entrainment of special-concern species</li> <li>• Improves flexibility to divert water during critical fish migration periods</li> </ul>
<ul style="list-style-type: none"> <li>• Evaluate, improve, and install behavioral barriers for anadromous fish</li> </ul>	<ul style="list-style-type: none"> <li>• Diverts anadromous fish from areas of potential entrainment</li> <li>• Allows for continued water diversions at current locations</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>• Acoustic barrier at the mouth of Georgiana Slough.</li> <li>• Evaluate barriers for Delta Cross Channel and Threemile Slough.</li> </ul>	

### Water Quality Management

Activities	Benefits
<ul style="list-style-type: none"> <li>• Core water quality actions only</li> </ul>	<ul style="list-style-type: none"> <li>• Basic level of improvement in Delta water quality</li> </ul>

## Institutional and Policy Features

### Habitat Programs

Activities	Benefits
<ul style="list-style-type: none"> <li>• Implement recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Program</li> </ul>	<ul style="list-style-type: none"> <li>• Provides additional habitat restoration</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>• Coordinate activities to avoid duplication.</li> </ul>	

**Management of System Vulnerability**

Activities	Benefits
<ul style="list-style-type: none"> <li>Establish and fund an emergency levee management plan to respond to levee failures</li> </ul>	<ul style="list-style-type: none"> <li>Provides resources to protect Delta functions</li> </ul>
<ul style="list-style-type: none"> <li>Establish landside buffer zones adjacent to levees on islands with deep peat soils</li> </ul>	<ul style="list-style-type: none"> <li>Provides increase in stability of Delta levees and reliability of Delta functions by reducing subsidence adjacent to levees</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Determine extent and cost-effectiveness of levee management programs, buffer zones</li> </ul>	

**Water Supply Management**

Activities	Benefits
<ul style="list-style-type: none"> <li>Establish a long-term drought water bank</li> <li>Increase conjunctive use for Sacramento Valley</li> </ul>	<ul style="list-style-type: none"> <li>Provides for long-term contracts for drought-year water</li> </ul>
<ul style="list-style-type: none"> <li>Implement groundwater banking in the San Joaquin Basin</li> </ul>	<ul style="list-style-type: none"> <li>Makes surface water available for drought-year transfer</li> </ul>
<ul style="list-style-type: none"> <li>Expand water conservation best management practices (BMPs) and implement and expand efficient water management practices (EWMPs)</li> </ul>	<ul style="list-style-type: none"> <li>Reduces demand for Delta water</li> <li>Could make water available for drought-year transfer</li> </ul>
<ul style="list-style-type: none"> <li>Include inclining block rates</li> <li>Include measurement of agricultural deliveries and water pricing structures to encourage efficient water use</li> <li>Implement wastewater reclamation programs</li> <li>Possible use of gray water for urban landscape irrigation</li> <li>Use of reclaimed wastewater for agricultural purposes</li> <li>Encourage land fallowing during drought periods</li> </ul>	<ul style="list-style-type: none"> <li>Reduces demand for Delta water</li> <li>Could make water available for drought-year transfer</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Need to develop institutional mechanisms for long-term operation of drought water bank.</li> </ul>	

## Preliminary Assessment

### *Benefits*

**Ecosystem Quality** — This alternative would enhance ecosystem quality through restoration of riverine, riparian, wetland, and adjacent terrestrial habitat; enhancement of fish spawning, rearing, and feeding habitats; and improved fish survival. Dedicated storage of about 100,000 AF of water could be used to reduce entrainment.

**Water Supply** — This alternative would improve water supply reliability by facilitating drought-year water transfers and conjunctive use. By increasing fish populations (through habitat improvements and reduced diversion effects), this alternative would reduce the likelihood of regulatory interventions in export operations.

**Water Quality** — This alternative would rely on core actions including point and non-point source controls and mine drainage remediation to improve water quality.

**System Vulnerability** — Improvement of levees around critical western islands would protect the island land uses and protect water supply operations from salinity intrusion due to island failure. Setback levees would increase levee stability, reduce flood danger, and provide opportunities for habitat restoration.

### *Constraints and Concerns*

Uncertain that drought bank and conjunctive use will provide sufficient water to supply all needs. Additional analysis and study is required.

Negative effects such as south-Delta flow reversal remain unresolved.

Provides only a basic level of improvement in water quality.

Fish entrainment is reduced but still a concern.